

A New Record of *Siriella trispina* (Crustacea, Mysida, Mysidae) from the Southern Coast of Korea

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ABSTRACT

The opossum shrimp, *Siriella* Dana, 1850 belongs to the family Mysidae Haworth, 1825. It is the genus of an enormous number of species with frequent morphological variations comprising 84 valid species to date. Among the species, *Siriella trispina* Ii, 1964 has been recorded from the Yellow Sea and the East China Sea is reported from Korean water for the first time. *Siriella trispina* is characterized by its exceedingly elongated 5th pair of thoracopods, the spines on the inner ventral margin of the uropodal endopod armed with secondary spinules, and 4–5 pairs of spines on the base of the telson. In the present study, we describe Korean specimens of the species in detail with photographs and illustrations. *Siriella trispina* is the 8th *Siriella* species found in Korean fauna.

Keywords: taxonomy, opossum shrimp, mysid, Mysidae, *Siriella*, *S. trispina*, Korea

INTRODUCTION

Mysids, or the so-called opossum shrimps, are shrimp-like zooplankton which are distributed widely from freshwater to brackish, estuarine, coastal and pelagic water (Kim et al., 2016). A vast number of mysid specimens have been collected from coastal regions around the world (Mauchline, 1980).

According to the previous records, 7 known species of *Siriella*, *S. affinis* Hansen, 1910, *S. gracilis* Dana, 1852, *S. izuensis* Murano and Fukuoka, 2008, *S. japonica* Ii, 1964, *S. koreana* Murano and Fukuoka, 2008, *S. okadai* Ii, 1964, *S. thompsonii* H. Milne Edwards, 1837, have mainly been reported in Korea, from the eastern and southern coasts (Ii, 1964; Chong, 1992; Jo et al., 1998; Jo, 2014). Additionally, *Siriella trispina* Ii, 1964, is reported from the southern part of the Korean peninsula.

Genus *Siriella* was initially divided into 4 groups by Hansen (1910) according to the characteristics of their telson, uropods, and male pleopods. Ii (1964) later amended this grouping system by further dividing the species into 6 groups

with 2 subgroups in order to arrange the species in the genus. Subsequently, Ii's groups were revised by Murano and Fukuoka (2008) to include the species newly reported after Ii (1964). Murano and Fukuoka (2008) established 3 further groups extended from Ii (1964) because these new species were not included in any of Ii's groups. Consequently, the genus *Siriella* is now divided into 9 groups with 5 subgroups.

Siriella trispina Ii, 1964 belongs to *Thompsonii*-group which is classified into five subgroups and the present species included in the *Trispina*-subgroup. The present species is closely allied to *S. nodosa* Hansen, 1910 which is included in the *Nodosa*-subgroup due to their extremely elongated 5th thoracopods. However, both species are distinguished from each other by the following characteristics: (1) *S. trispina* has no protuberances on the surface of the carapace, while the female of *S. nodosa* has 1 or 2 protuberances on their carapace, (2) *S. trispina* has 3 to 5 pairs of spines on the base of the telson, whereas *S. nodosa* has a single pair of spines on the basal part of their telson, (3) in *S. trispina*, the spines on the inner ventral margin of the uropodal endopod have secondary spinules, while *S. nodosa* has normal spines

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on their inner ventral margin.

The specimens were collected by light traps during high tide from a harbor in Busan, Korea. To obtain planktonic specimens, the direction of the entrance of the light trap was toward the water surface. Obtained samples were directly fixed in 90% ethyl alcohol and classified under stereoscopic microscope (SMZ-1500; Nikon, Tokyo, Japan). Classified specimens were later moved to glycerin mixed with 99.9% ethyl alcohol (8 : 2) and then dissected in pure glycerin (Kim et al., 2015). Each appendage was illustrated using a compound microscope (BX-51; Olympus, Tokyo, Japan) fitted with drawing tube. Images were taken using a digital camera (D5300; Nikon) and complemented with Helicon Focus software (Model Helicon Focus; Helicon Soft Ltd., Kharkov, Ukraine). Body length was measured following Tattersall and Tattersall (1951) from the tip of the carapace to the distal margin of the telson except the apical spines. All samples have been deposited in the Marine Arthropod Depository Bank of Korea (MADBK), Seoul National University and the National Institute of Biological Resources (NIBR), Incheon, Korea.

SYSTEMATIC ACCOUNTS

Order Mysida Boas, 1883

Family Mysidae Haworth, 1825

Subfamily Siriellinae Norman, 1892

Genus *Siriella* Dana, 1850

¹**Siriella trispina* Ii, 1964 (Figs. 1–4)

Siriella trispina Ii, 1964: 86, fig. 21; Mauchline and Murano, 1977: 77; Cai, 1980: 40, Pl. 1, figs. 1–9; Müller, 1993: 56; Wang and Liu, 1997: 203; Liu and Wang, 2000: 106, fig. 23; Murano and Fukuoka, 2008: 137, figs. 69–70.

Material examined. Korea: Busan: 1♂, Nam-gu, Yonghoro, Baegunpo, 16 Mar 2017, by light trap, depth 7 m (MADBK500166_001); 1♂, 1♀, Yeongdo-gu, Taejongro, Korea Maritime and Ocean University, 12 May 2017, by light trap, depth 8 m (MADBK500166_002); 1♂, Nam-gu, Yonghoro, Baegunpo, 23 Jun 2017, by light trap, depth 8 m (MADBK500166_003).

Description. Carapace (Fig. 2A) normal, anteriorly produced into triangular rostral plate with blunt apex, extending to base of first segment of antennular peduncle; antero-lateral corners slightly rounded; pseudo-rostral process produced with pointed tip.

Eyes (Figs. 1, 2A) normal size, including eyestalk; cornea occupying 1/3 of whole eye.

Antennal scale (Fig. 2B) about 3 times as long as broad; setose all around except outer margin; outer margin straight, terminating into a stout denticle; apical suture occupying about 1/10 of whole length of antennal scale. Antennal peduncle (Fig. 2B) 3-segmented; second segment longest, about 2.5 times as long as first, about 2 times as long as third segment.

Antennular peduncle (Fig. 2C) 3-segmented; robust in male, first segment longest, about 3 times as long as second one and armed with 8 plumose setae; second segment shortest, about 2/5 length of third segment, bearing 5 normal plumose setae on outer margin and 1 stout plumose setae on inner margin; male appendix masculina long, about 1/2 length of third segment in dorsal view; inner flagellum more slender than outer one.

Maxilla (Fig. 2D) typical form of the genus; basal endites armed with spiniform setae bearing secondary spinules; exopod with 10 setae; endopod with 21 setae, about 3 times as long as broad.

Mandibular palp (Fig. 2E) 3-segmented; first segment naked, about 1/10 length of second one; second segment lon-

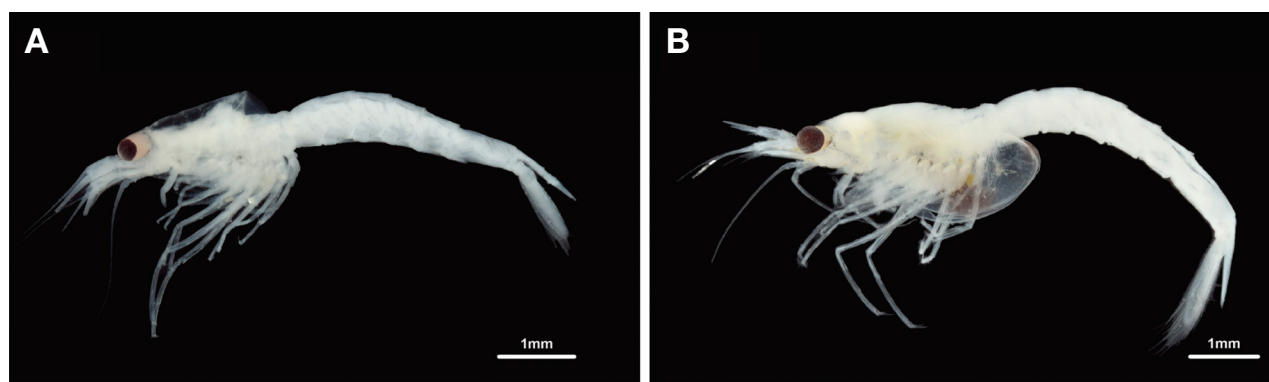


Fig. 1. *Siriella trispina* Ii, 1964. A, Male, whole specimen, 6 mm; B, Female, whole specimen, 8 mm. Scale bars: A, B = 1 mm.

Korean name: ¹*네가시나선곤쟁이 (신칭)

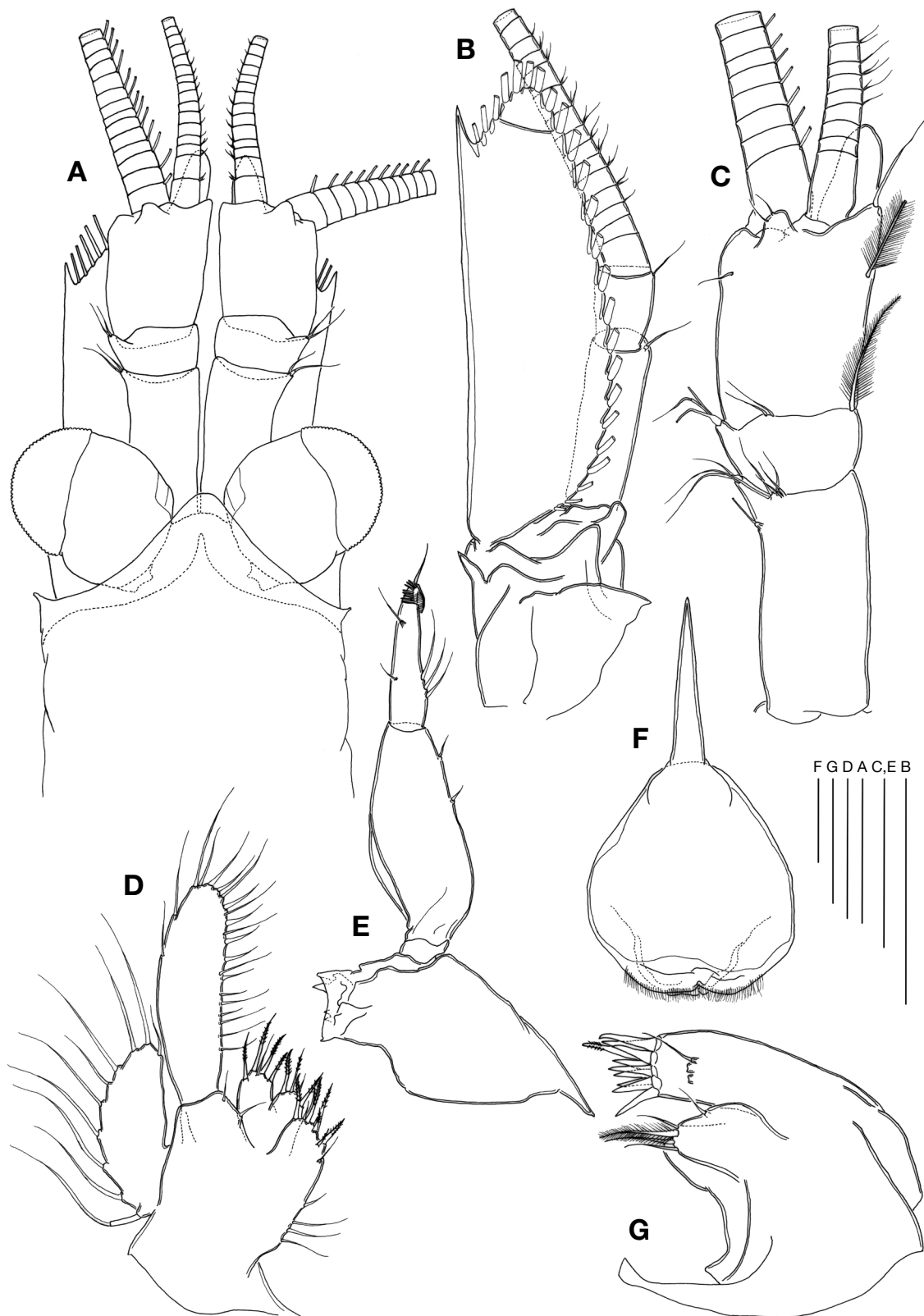


Fig. 2. *Siriella trispina* Ii, 1964, male. A, Dorsal view of carapace; B, Antenna; C, Antennule; D, Maxilla; E, Mandible; F, Labrum; G, Maxillule. Scale bars: A, B=0.4 mm, C, E=0.3 mm, D=0.15 mm, F, G=0.1 mm.

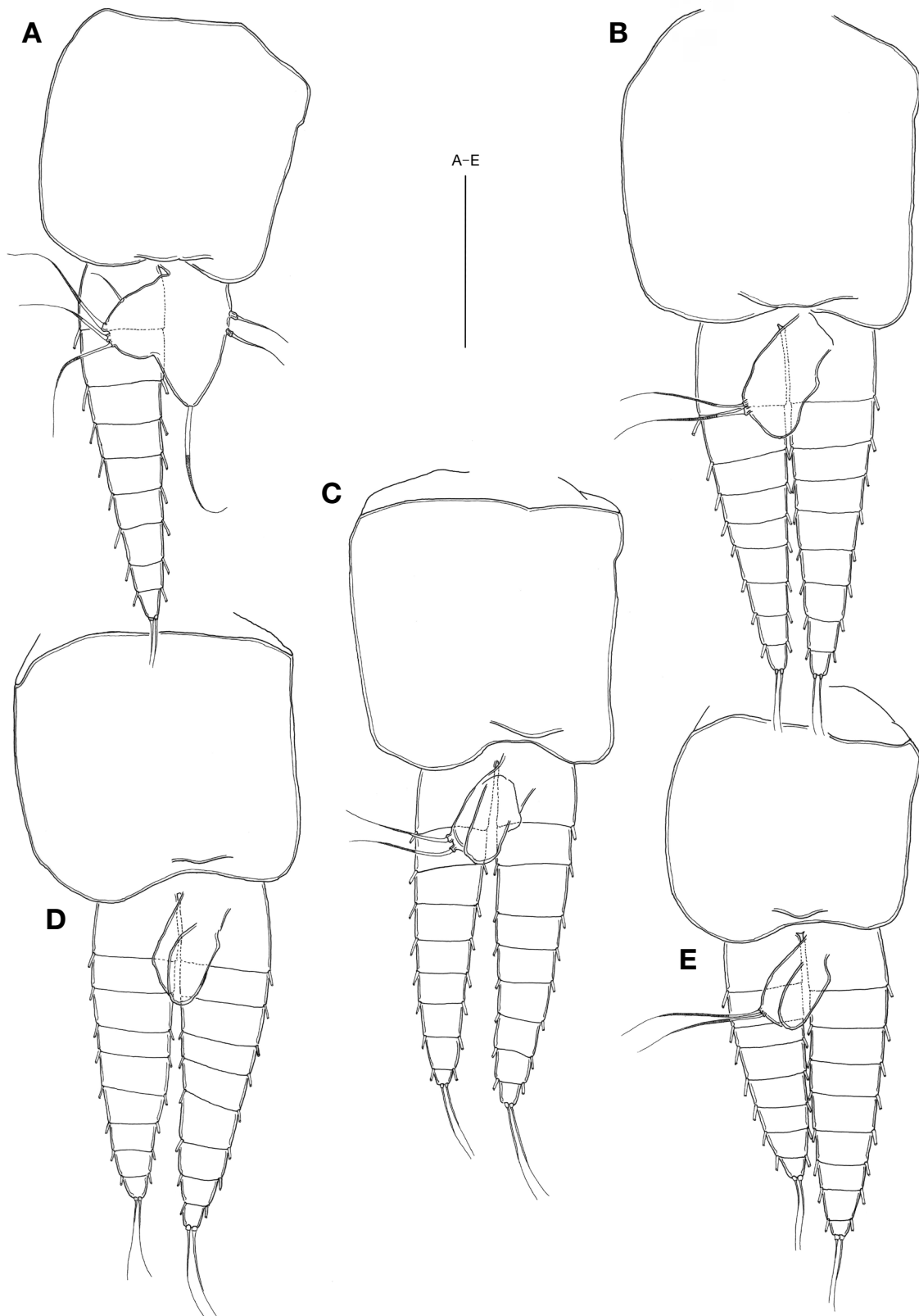


Fig. 3. *Siriella trispina* Ii, 1964, male. A, First pleopod, left; B, Second pleopod, left; C, Third pleopod, left; D, Fourth pleopod, left; E, Fifth pleopod, left. Scale bar: A-E=0.15 mm.

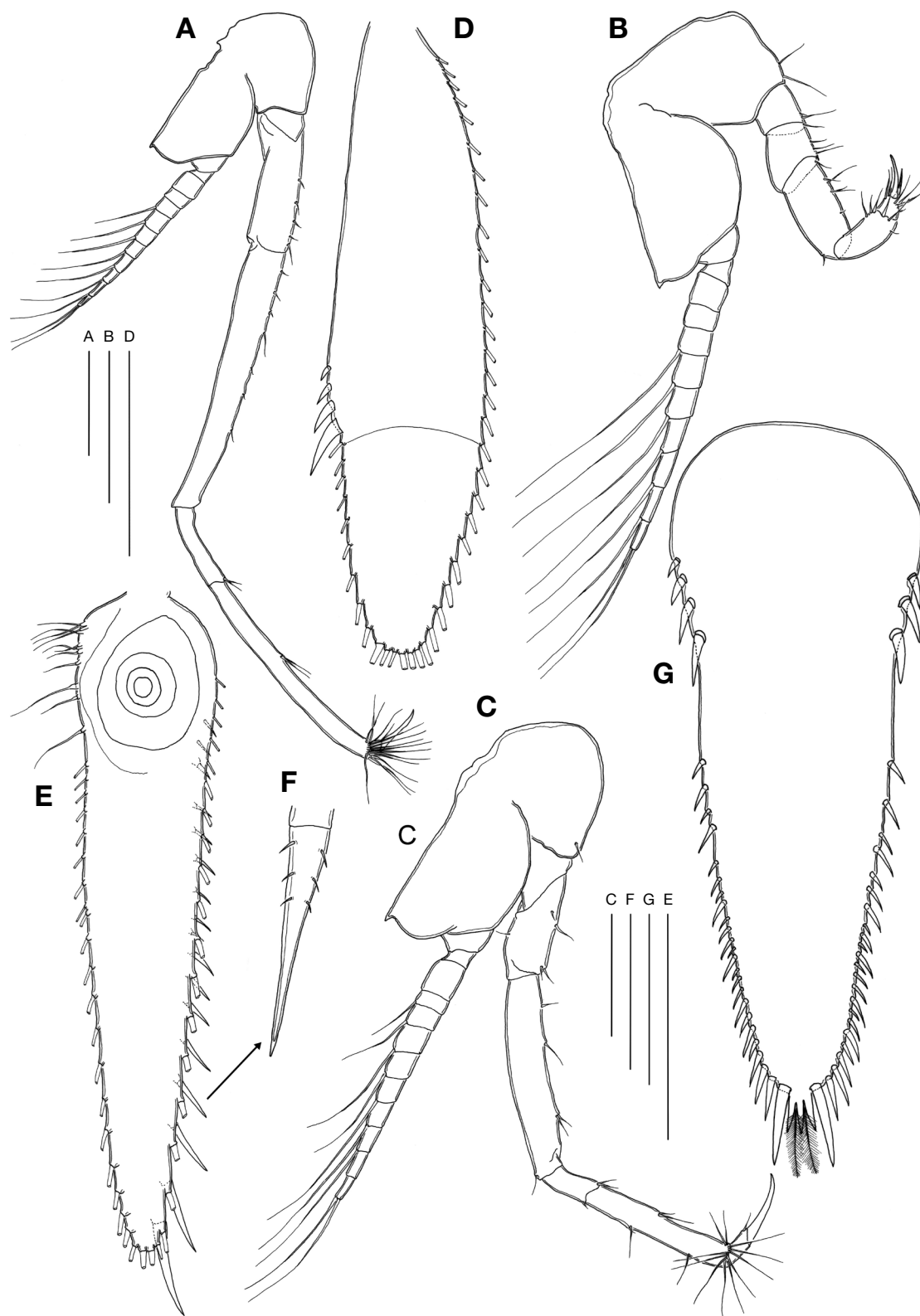


Fig. 4. *Siriella trispina* Ii, 1964, male. A, Fifth thoracopod, left; B, First thoracopod; C, Eighth thoracopod; D, Uropodal exopod; E, Uropodal endopod; F, One of the spines of uropodal endopod, detail; G, Telson. Scale bars: A, D, E=0.4 mm, B, C, G=0.3 mm, F=0.05 mm.

gest, inner margin slightly wrinkled, with 2 short setae on outer margin; third segment with 3 long setae on outer margin, 2 setae on inner margin; 8 subapical spiniform setae, and 2 distal long setae.

Labrum (Fig. 2F) with anteriorly long beaky process, about 2 times as long as broad; distal end setose.

Maxillule (Fig. 2G), outer lobe armed with 9 blunt spines and 1 slender spine bearing secondary spinules on distal end, and 3 minute setae on proximal surface; inner lobe with 5 plumose setae.

Pleopods of male (Fig. 3A–E) biramous, endopod and exopod subequal in length except first and fifth pleopods; first to fourth exopods 9-segmented, fifth exopod 8-segmented; endopod of first pleopod not segmented, bearing 4 long plumose setae and 3 short setae, endopods of second to fifth pleopod 9-segmented; pseudobranchial rami on second, third and fifth male pleopods with 2 long plumose setae.

Endopods of first thoracopods (Fig. 4B) rather short, endopods of remaining thoracopods conspicuously elongated from third to fifth pairs and shorter from sixth to eighth pairs, endopod of fifth thoracopod (Fig. 4A) remarkably long; endopods of third to eighth thoracopods with 2-subsegmented carpopropodus, distal segment evidently longer than proximal segment; distal end of carpopropodus setose, stretched in all directions; exopod of first thoracopod (Fig. 4B) 11-segmented, exopods of second to eighth thoracopods (Fig. 4C) 12-segmented; bases of exopod of all thoracopods bearing small stout denticle on outer distal corner.

Uropodal endopod (Fig. 4E) slightly shorter than telson, with 17–21 prominent spines on inner ventral margin extending from statocyst to distal end, gradually increasing in size distally; spines (Fig. 4F) on inner ventral margin armed with secondary spinules.

Uropodal exopod (Fig. 4D) slightly longer than telson, proximal segment bearing 4–5 spines on distal 1/4 of outer margin and each spine increasing in size distally; distal segment occupying about 1/3 of whole length of uropodal exopod, about 1.5 times as long as broad.

Telson (Fig. 4G) elongated linguiform, rather narrow distally; about 3 times as long as broad at base; lateral margin of base armed with 3–4 spines on each side, each spine getting increased in length toward distal apex; a single pair of stout long apical spine on distal margin, about 2 times longer than median spines; 3 distal spines between a pair of apical spines with a pair of plumose setae, a pair of plumose setae somewhat longer than a pair of apical spine.

Distribution. East China Sea, Yellow Sea, Japan (central and western), and Korea (southern coast).

Remarks. *Siriella trispina* Ii, 1964 was newly described from the East China Sea and the Yellow Sea by Ii (1964). Subsequently, this species was reported again from the East

China Sea, the Yellow Sea and the South China Sea (Wang and Liu, 1997). Recently, Murano and Fukuoka (2008) provided some remarks and illustrations on the intraspecific variations of the species with central and western Japanese specimens. Even though the present specimens are not completely matured, especially in their pleopods and uropods, the characteristic of the examined specimens coincide with the previous descriptions given by Ii (1964) and Murano and Fukuoka (2008), except for some minor differences as follows: (1) the number of spines on the inner ventral margin of the uropodal endopod was 17–21 in Ii (1964), but the Korean specimens have 24–28; (2) the proximal segment of the uropodal exopod has 6–10 spines in Ii (1964), while 4–5 spines in the Korean specimens; (3) the pseudobranchial rami of the second to fourth pleopods of the male spirally coiled in Ii (1964). However, in the Korean specimen, the rami are not fully developed but showed 2 short, uncoiled rami. Also, Murano and Fukuoka (2008) mentioned that the second to fifth pleopods of the male bear an 11-segmented endopod and exopod, respectively, while in the Korean specimen, the second to fourth male pleopods have 9-segmented endopod and exopod, respectively.

These differences may be derived from the differences in the levels of maturity and even with these minor differences, the present specimen is regarded as *Siriella trispina* in terms of the characteristics as follows: (1) length of 5th thoracopods compare with the other thoracopods; (2) the shape of the telson, especially the number of spines on the lateral margin of the base.

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